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QUALITY OF CARE AND CONTRACEPTIVE PILL DISCONTINUATION IN RURAL EGYPT

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Summary. Indicators of family planning service access and quality were generated using the Egypt DHS-I (1988) and the Egypt Service Availability Survey (1989), and linked to episodes of contraceptive pill use. Multilevel analysis was used to ascertain whether or not these access and quality indicators influence the continuation of pill use, net of women's socio-economic, demographic and motivational characteristics. A model with random components at the cluster and women levels was fitted for all reasons of discontinuation, except desire for pregnancy, at 24 months of use. Net of women's background characteristics, the results show that facilities with smaller numbers of health personnel trained in family planning, a lack of access to facilities with female doctors and a lack of range of available methods are associated with a high risk of discontinuation of pill use for all reasons except desire for pregnancy.

Introduction

The quality of family planning services received huge attention in the 5 years following publication of Judith Bruce's 'quality of care' framework (Bruce, 1990). A renewed determination to improve family planning provision is, of course, extremely welcome, but in view of resource constraints, a sharper focus and a clearer sense of priorities is urgently needed. Some dimensions of quality are desirable, or even essential, in any circumstances. Included under this heading are the technical competence of staff, the observance of standards of hygiene and the treatment of clients with dignity and respect. No research is needed to support these objectives, though monitoring of standards is important.

However, other dimensions of quality are not absolute prerequisites in the same sense. It is not immediately obvious, for instance, which types of counselling, or how much or when, should be provided to clients, or which procedures should be advocated for follow-up. Similarly, the degree of privacy offered, the amount of medical screening that takes place, waiting time at clinics and geographical density of services are not readily amenable to simple universal recommendations. Practical

guidelines on these and many other aspects of service provision should be based, not on assertion, but on empirical evidence. This evidence can be grouped into three main types: direct investigation of the priorities of clients and potential clients; experiments to assess the impact of specific improvements in service provision; and non-experimental analyses that seek to link community-level data on service characteristics to individual-level data on acceptability or satisfaction.

The first type of evidence is relatively simple to obtain by largely qualitative research on the views and preferences of clients and potential clients. Providers need to know which characteristics of services matter most to individuals. However, despite the current emphasis on the user's perspective, it is disappointing how little research has been devoted to this topic, although a useful start has been made (*Reproductive Health Matters for WHO, 1999*).

The second type of evidence seeks to establish priorities for improvement of services, not by direct questioning of clients, but indirectly in an experimental or quasi-experimental manner. Ideally, some improvement of service provision – perhaps a change in the counselling or follow-up procedures – should be introduced in an experimental way and its effect on client satisfaction assessed. Only those innovations or improvements that pass a simple cost-effectiveness criterion should be considered for widespread application. Though some interesting experiments were conducted in the early 1970s (e.g. Bang, 1971; Chan, 1971), there appears to have been very little recent research of this type. One of several possible reasons for this is the difficulty of selecting suitable outcome measures. Direct measures of client satisfaction have not proved useful. In the early 1980s, many contraceptive prevalence surveys included simple questions on satisfaction with services. Typically 90% or more of current or past clients expressed satisfaction. This result merely implies that the majority of women are reluctant to express open criticism of government services. An alternative measure of satisfaction – albeit a less direct one – is the willingness of clients to persist in the use of chosen contraceptive methods and willingness to continue to use the same service or family planning outlet. This measure is based on the assumption that women who are satisfied with a service will be more likely to continue use of methods and services than women who are dissatisfied.

The third type of evidence links individual-level data on acceptability or satisfaction with cluster- or community-level data on quality of services. This paper presents evidence of this third type. The research is built on two earlier studies that used life table analysis to compare methods and cause-specific continuation rates, and a multivariate analysis to determine the factors influencing discontinuation (Ali & Cleland, 1995, 1999). The focus here is on factors influencing continuation of pill use in rural Egypt, as this is the most commonly used contraceptive method in rural Egypt. The analysis highlights the effect on pill continuation of various indicators of service access and quality, net of women's socioeconomic, demographic and motivational characteristics, and prior experience of the method. It is believed that this is one of the very few studies that has attempted to use DHS service availability data to examine contraceptive continuation rates. Though the results cannot be as convincing as those from an experimental study, they may nevertheless reveal whether the willingness and ability of women to persist with use of oral contraceptives is conditioned by the service environment.

There are at least two objections to the use of method-continuation rates as an indirect indicator of client satisfaction. First, one common reason for discontinuation is the desire for another pregnancy. This motive for stopping implies no dissatisfaction with the service or method. This objection can be overcome easily by censoring episodes that end for this reason. The second objection concerns termination of use of one method in order to switch to another. Such method switching may be an indication of access to a wide range of methods and thus a reflection of high quality services rather than ones of poor quality. This objection, in principle, introduces bias, but it is of little practical significance in this study as of all use-episodes studied, only 7% involved switching to another method within 3 months of stopping.

Data

The data for this analysis were drawn from the Egypt 1988 Demographic and Health Survey (EDHS-I), and the Egypt 1989 Service Availability Survey (ESAS), linked together by cluster number. The EDHS-I provided information on episodes of contraceptive use within the previous 5 years (approximate time of start, duration of use and reason for stopping, where appropriate). The individual record data manipulation and the limitation of the data have been explained elsewhere (Ali & Cleland, 1995, 1999). The data manipulation for the service availability survey described here is explained below.

The ESAS questionnaire was designed to collect detailed information about the access to services and their quality in each of the 120 rural villages selected in the EDHS-I. To achieve this, information was gathered at the village level about five types of service facilities: the number of facilities in the community, and the distance/travel time (measured in kilometres/minutes) to the nearest facility of each type. In order to obtain information about the quality of services, all facilities located in the village, or the nearest facility of each type, were visited.

The first section of the questionnaire collected information about geographical characteristics and general information about the facilities and services available in the village or within 30 km of it. This included: type of public transportation; presence of schools, telephone and post office and similar services in the village, or distance to them; whether the village was covered by a traditional birth attendant (*daya*), a trained nurse-midwife, community-based family planning (CBFP) workers or a family planning nurse. The second section of the questionnaire collected detailed information about five types of service facilities, if available in the village or within 30 km. These facilities were: (1) government hospitals, (2) government MCH centres, (3) government family planning clinics, (4) private voluntary family planning clinics, and (5) pharmacies. From each surveyed facility, detailed information was collected about the distance to the facility from the village centre and the approximate time required to reach the facility, type of services offered, and number of staff personnel with particular skills. For more information on these surveys see Sayed *et al.* (1989) and Sayed (1991).

Informants for the survey varied depending on which section of the questionnaire was being addressed. Information on general and geographical characteristics was

obtained from the village headman or an official working in the village. Information on facilities was gathered from relevant staff at each facility being surveyed.

From the many village and facility characteristics that were investigated in the ESAS, the following three main categories of characteristics were selected, either from the original data file or derived from several other variables. Factor analysis was used to provide a summary score for different dimensions of access and quality of services.

(a) Village characteristics were represented by two variables:

1. Type of main access road into village in which cluster was located, classified as paved road or other (which included unpaved or no road).
2. Distance (in km) to the nearest town grouped into: 1–5, 6–10 and 11+ km.

(b) Access to services was represented by the following three variables:

1. Standardized score for the total number of trained health personnel who provided family planning information or services. These included trained nurses/midwives, trained *dayas*, CBFP workers and FP nurses in the village, grouped into: low, moderate and high.
2. Number of facilities that provide family planning and MCH services in the village or within 30 km of the village, grouped into: <5 and 5+.
3. A proximity standardized score that represented the mean distance/travelling time from the centre of the village to family planning facilities, grouped into: below average and average or above.

(c) The quality of services available to each village was represented by three variables:

1. The percentage of family planning doctors who were female: this measure was computed from data on the total number of male and female doctors who provided family planning services in all facilities that were in the village or within 30 km grouped into: none, up to 25% and 26%+.
2. A summary of the scores of staff competence and training; this was derived from data on numbers of staff with family planning training, numbers trained in IUD insertion and numbers of medical doctors who insert IUDs on a regular basis. A standardized score was computed for each facility, then summarized and grouped into: low, moderate and high.
3. A score that summarizes the range of family planning methods available in facilities, grouped into: below average and average or above.

It cannot be claimed that these measures of access and quality are ideal or comprehensive. For instance, no data were available on the nature of provider–client interactions, which is thought by many to be a crucial dimension of quality (Bruce, 1990). Moreover it was not possible to match individual users to specific facilities. Nevertheless, the information collected in the ESAS is exceptionally detailed and is certainly sufficient to establish whether or not certain aggregate components of access and quality exert an influence on oral contraceptive use-continuation.

Table 1. Availability of health and family planning services or family planning personnel

	Villages with:		
	None	1	2+
Type of facility			
Government hospital	0.8	98.3	0.8
Government MCH	4.2	95.0	0.8
Government FP clinic	8.3	89.2	2.5
Private FP clinic	50.8	49.2	0.0
Pharmacy	0.0	75.8	24.2
Health & FP personnel			
Daya trained in FP	70.8	12.5	16.7
Trained nurse/midwife	30.0	15.8	54.2
CBFP worker	53.3	32.5	14.2
FP nurse	31.7	38.3	30.0

Methods

The resulting file had a three-level hierarchical structure. Times of 3-month interval (level 1) were nested within-woman (level 2) and women were nested within-village (level 3). (Since fewer than 16% of respondents reported more than one episode of pill use, the episode level was ignored.)

The hypothesis used was that respondent and service characteristics jointly influence method-continuation, and that the outcome of interest is a binary response (Ali & Cleland, 1999). A multilevel complementary log-log (CLL) regression model was used to estimate, simultaneously, the effect of women’s characteristics and access and quality of care indicators at the village level on pill discontinuation for all reasons, except desire for pregnancy, in rural Egypt.

A simple multilevel extension of the standard complementary log-log (CLL) model was used. Let π_{ijk} denote the probability of discontinuation at the k^{th} time interval for the j^{th} woman at the i^{th} village. Conditional on random effects z_{ij} and z_i representing unobserved characteristics of the women and the villages respectively, the CLL of the probability of π_{ijk} is given by the following equation:

$$\log\{-\log(1 - \pi_{ijk})\} = x_{ijk}\beta + w_{ij}\gamma + y_j\eta + z_{ij}u_{ij} + z_i v_i$$

where x_{ijk} , w_{ij} and y_j are vectors of time interval, woman characteristics and village characteristics respectively, and β , γ and η are vectors of estimated parameter coefficients (the fixed part of the model). The terms u_{ij} ($\sim N(0, \sigma_u)$) and v_i ($\sim N(0, \sigma_v)$) are error terms at the woman and village level respectively (the random part) and are assumed to be uncorrelated with the observed covariates. The above model is known as a random intercepts- or variance-component model (Longford, 1993).

Table 2. Cumulative life table probabilities of discontinuation for all reasons except desire for pregnancy at 12 and 24 months per 100 episodes of pill use, by women's characteristics

	No. of episodes	Probability of discontinuation	
		12 months	24 months
Socioeconomic			
Region of residence			
Lower Egypt	766	30.2	50.6
Upper Egypt	285	39.6	54.2
Women's education			
No education	578	34.3	51.3
Primary	375	31.0	51.6
Secondary+	98	24.6	54.4
Husband's education			
No education	374	33.8	51.4
Primary	471	32.4	51.6
Secondary+	206	29.5	51.5
Demographic and motivational			
Age group (years)			
<25	363	39.6	64.1
25-35	492	29.0	46.9
35+	195	27.8	41.7
Number of living children			
0-1	149	46.4	64.6
2-3	380	35.4	57.4
4+	521	26.6	44.0
Desire for another child			
Actual=desire	189	30.1	49.1
Actual<desire	272	44.5	69.6
Actual>desire	424	26.7	43.4
Not stated	166	31.4	51.3
Prior use of pill			
Didn't use	721	38.3	57.3
Used before	300	19.6	39.3
Village characteristics			
Main access road into village			
Asphalt or cement	850	31.2	52.2
Other	201	36.7	49.2
Distance to nearest town (km)			
1-5	338	29.1	50.2
6-10	404	28.9	48.3
11+	309	41.4	57.6

Table 2. *Continued*

	No. of episodes	Probability of discontinuation	
		12 months	24 months
Access to services			
Trained health personnel who provide FP score			
Low	249	38.0	54.5
Moderate	377	35.7	56.9
High	424	26.1	45.0
Number of facilities providing FP			
≤4	494	35.1	56.1
5+	557	29.7	46.8
Proximity score			
<Average	664	29.8	50.8
Average+	387	37.0	52.9
Quality of care			
Percentage female among MDs who provide FP			
None	225	36.7	52.8
Up to 25%	560	32.8	52.9
26–75%	265	27.5	47.3
Staff competence score			
Low	345	32.4	52.3
Moderate	343	31.6	52.4
High	362	32.9	49.7
Range of FP methods available score			
<Average	466	32.1	51.1
Average+	584	32.5	51.7

The parameters of the above model were estimated using the second-order Penalized Quasi-likelihood (PQL) approximation implemented in the Statistical Package MLn (Goldstein, 1991, 1995; Rasbash & Woodhouse, 1995). Prior to the multivariate analysis, the single-decrement life table technique was used to calculate the crude cumulative probabilities of discontinuation of pill use at 12 and 24 months by women's and village characteristics.

Results

The selected villages share similar physical characteristics. Seventy-five per cent have a nuclear settlement pattern, 81% are located within 15 km of the nearest city or town, 77% are accessible by minibus or collective taxi and 87% have paved roads. With regard to health and family planning infrastructure, more than 90% of the villages are located within 30 km of the three types of government facilities.

Pharmacies are accessible from all villages, while only half of the villages are located within 30 km of private family planning services (Table 1).

Rural women receive health and family planning services through a group of government and private sector facilities working at the village level. Table 1 shows the distribution of villages according to the number of health and family planning personnel. Only 29% of the sampled villages have at least one trained *daya*; 70% are covered by one or more trained nurse/midwife, almost half by CBFP workers and 60% by a family planning nurse.

Table 2 shows the cumulative life table probabilities of discontinuation at 12 and 24 months after initiation of use for all reasons except desire for pregnancy, by women's and village characteristics, and by indicators of service availability and quality. As explained earlier, the reason for excluding discontinuation in order to have another child is that this motive for stopping is unlikely to reflect problems of access to, or quality of, services. Conversely, discontinuation for most other reasons may reflect inadequacies of services.

As expected, cumulative probabilities of discontinuation for the pill tend to be higher among respondents who live in settings with sparse or poor quality family planning services. Typically, women resident in villages with fewer health personnel trained in providing family planning information and methods, or who have access to fewer facilities that provide FP/MCH services, are more likely to cease use of the pill than respondents in better-served villages. Similarly, the percentage of female family planning doctors and the 'information provided to clients' score are related to contraceptive discontinuation in the anticipated direction. However, neither staff competence nor range of methods available appears to exert an influence on discontinuation.

Random effect discrete-time event hazard models were fitted up to 24 months. Table 3 shows the crude and adjusted relative risks (RR) of discontinuation relative to continued use of the method according to village and service availability and quality covariates. Significant effects ($p < 0.05$) are identified in bold typeface. Relative risks that are greater than 1.0 indicate a higher risk of discontinuation than the risk for the reference category of each covariate.

The effects of most of the covariates on continuation are in the expected directions with very few exceptions, such as the effect of distance to the nearest town and range of family planning methods available.

These initial results serve as a way of screening for the important predictors to be considered in reaching a final parsimonious model using forward and backward procedures. Table 4 presents the parameter estimates and standard errors with relative risks (RR) for the final selected random effect hazard model.

The results for discontinuation for all reasons except desire for pregnancy are summarized in Table 4. A low number of health personnel trained in family planning is associated with a high risk of discontinuation. Respondents living in villages with low numbers are 50% more likely to stop using the pill within 2 years of initiation than respondents living in villages with higher numbers. Women having no access to facilities with female family planning doctors are more likely to discontinue use of the pill (RR=1.54). An additional quality indicator enters the model with a borderline level of significance, i.e. range of available methods. Contrary to expectations, a narrower range of available methods is associated with lower rather than higher

Table 3. Crude and adjusted relative risks (RRs) of discontinuation for all reasons except desire for pregnancy at 24 months of pill use, by village characteristics, access to services and quality of care indicators

		RR	95% CI
Village characteristics			
Main access road into village	(Asphalt or cement)		
	Other	Crude 1.17	(0.91–1.52)
		Adjusted 0.87	(0.63–1.21)
Distance to nearest town (km)	(1–5)		
	6–10	Crude 0.94	(0.74–1.20)
		Adjusted 0.97	(0.73–1.28)
	11+	Crude 1.17	(0.92–1.50)
		Adjusted 1.15	(0.87–1.53)
Access to services			
Trained health personnel who provide FP score	(High)		
	Moderate	Crude 1.32	(1.05–1.67)
		Adjusted 1.25	(0.97–1.61)
	Low	Crude 1.38	(1.06–1.80)
	Adjusted 1.34	(1.00–1.80)	
Number of facilities providing FP	(4+)		
	1–3	Crude 1.17	(0.96–1.44)
		Adjusted 0.97	(0.76–1.25)
Proximity score	(Average+)		
	<Average	Crude 1.18	(0.96–1.49)
		Adjusted 1.28	(0.97–1.69)
Quality of care			
Percentage female among MDs who provide FP	(26%–75%)		
	Up to 25%	Crude 1.26	(0.99–1.61)
		Adjusted 1.12	(0.85–1.48)
	None	Crude 1.46	(1.10–1.96)
	Adjusted 1.29	(0.91–1.83)	
Staff competence score	(High)		
	Moderate	Crude 1.01	(0.80–1.29)
		Adjusted 0.93	(0.70–1.25)
	Low	Crude 1.17	(0.92–1.49)
	Adjusted 1.00	(0.72–1.37)	
Range of FP methods available score	(Average+)		
	<Average	Crude 0.87	(0.71–1.06)
		Adjusted 0.70	(0.54–0.91)

Reference categories are in parentheses.

discontinuation. One possible reason is that women who face a restricted choice of methods have less freedom to switch to another method and therefore persist (albeit reluctantly) with the initial method. Other significant predictors are: a small number

Table 4. Parameter estimates, standard error and RR for random effect discrete-time model comparing all reasons of discontinuation of pill use (except desire for pregnancy) with still using at 24 months

	Coeff.	(SE)	RR
Fixed part			
Constant	- 3.41	(0.248)	
Number of living children			
4+	0.00		
2-3	0.39	(0.147)	(1.48)
0-1	0.36	(0.211)	(1.43)
Desire for another child			
Actual=desire	0.00		
Actual<desire	0.47	(0.169)	(1.60)
Actual>desire	0.08	(0.177)	(1.08)
Not stated	0.21	(0.188)	(1.23)
Prior use of pill			
Used before	0.00		
Didn't use before	0.55	(0.122)	(1.73)
Number of trained health personnel who provide FP score			
High	0.00		
Moderate	0.36	(0.140)	(1.43)
Low	0.47	(0.156)	(1.60)
Percentage female among MDs who provide FP			
26%-75%	0.0		
Up to 25%	0.23	(0.151)	(1.26)
None	0.43	(0.176)	(1.54)
Range of family planning methods available			
Average+	0.00		
<Average	- 0.24	(0.121)	(0.80)
Random part			
σ_u^2 (woman level)	0.112	(0.098)	
σ_v^2 (village level)	0.085	(0.041)	

of living children, desire for more children and lack of prior experience with oral contraception.

The random part of the model measures the extent of the variability in discontinuation rates across women and villages that is not accounted for by the covariates measured at these levels. The result shows that there is an unexplained significant heterogeneity between villages that cannot be explained by the fixed part parameters.

Discussion

At the start of this paper, it was asserted that the debate on the quality of family planning services needs to be sharpened. In view of resource constraints, priority

should be given to improvements that will be most valued by clients and potential clients. To reach a decision, empirical evidence rather than rhetoric is required.

This paper represents an exploratory attempt to ascertain whether information from cross-sectional surveys, such as those conducted under the auspices of the DHS, can be useful in this regard. A large number of DHS enquiries have collected very detailed information on contraceptive continuation and on the number, nature and quality of family planning services near sampled clusters. By linking these two types of data, relationships between indicators of service access and quality and contraceptive continuation can be explored. Thus far, there is little evidence as to the effect of service quality on service use or service continuation, nor are the few available results consistent. A multi-site study revealed no effects of several quality indicators (Huezo *et al.*, 1993). Conversely, a study in Bangladesh showed a large effect of quality of outreach services (Huezo *et al.*, 1993; Koenig *et al.*, 1997). Similarly an earlier study in Mexico showed that the amount of information imparted to clients had a positive influence on continuation (Keller, 1973).

The length of an episode of contraceptive use is not an ideal measure, even after exclusion of episodes that are stopped because the couple wanted another child or because of switching to another method. Continued use of a facility or a service would have been more appropriate for an investigation of the effects of service quality on family planning behaviour. However, data on continuity of use of the service facilities were not collected in the DHS and therefore there was no alternative but to use discontinuation of a particular method as an indirect, surrogate measure of satisfaction with services.

In view of the crude nature of the outcome variable, it is surprising that positive effects of service access and quality on oral pill continuation were found. These results are even more surprising when it is taken into account that use-continuation could be related to the general service environment but not to the specific facilities used by individual women. Nevertheless, it appears from the analysis that both the number of family planning facilities in the vicinity and access to female family planning doctors may influence the ability and willingness of couples to be prolonged and successful users of oral contraception. Other indicators of access and quality had no effect on use-continuation.

The more important of these positive findings relates to the presence of female family planning doctors. Approximately 25% of pill users had no ready access to a female family planning doctor (i.e. no facility within 30 km of the village had such a staff member). Oral contraceptive users in these settings experienced 1.45 times the risk of stopping use of the pill within 24 months than women living in villages where more than one-quarter of family planning doctors were women. While this association falls short of proof that there is a direct causal link, it is highly suggestive and extremely plausible, and certainly warrants further investigation. The training and posting of more female doctors could represent an important step in improvement of service quality in rural Egypt.

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